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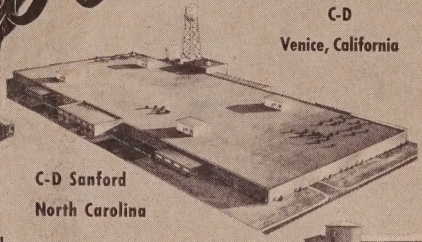

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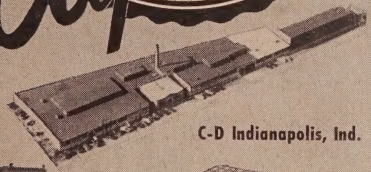

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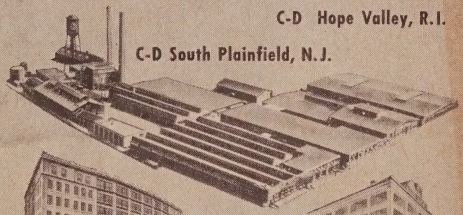

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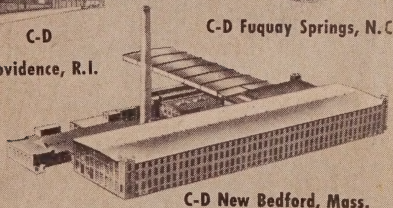

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To You . . . whom we think of as a friend and for whose pleasure and profit "The Capacitor" is dedicated, we sincerely wish a **New Year** of continued happiness and prosperity.

CORNELL-DUBILIER ELECTRIC CORPORATION.

FOOLPROOFING BATTERY-OPERATED EQUIPMENT

There are many instances in which battery-operated equipment is to be preferred to apparatus operated from the power line. The most obvious examples are complete portability and field operation remote from power lines. Additionally, separate battery operation of each instrument in a test setup eliminates (or at least greatly minimizes) troublesome interaction and stray coupling often caused by operating all of the instruments from the power line. Another advantage of battery operation is its elimination of hum generation and much of noise generation. Equipment powered by dry batteries often is lighter in weight, smaller in size, and cooler operating than comparable equipment containing built-in a-c power supplies.

Since these advantages are so obvious, it might seem strange that electronic equipment is so infrequently operated from batteries. However, the reasons are equally obvious: In some circuits, the current drain is too high for battery supply to be feasible. In moderate-current applications, the replacement of **A** and **B** batteries is comparatively expensive and has some nuisance value. This disadvantage is intensified when a set of batteries is lost through burnout when an unused instrument is left running.

While no system of foolproofing is 100% dependable, a few schemes are available for protecting battery-operated equipment from human error. One or more of these schemes may be enlisted to insure full service from batteries in such equipment. This article describes several practical methods.

2-Sided Approach

There are two approaches to the problem: (1) monitoring the equipment so that the operator knows when it is switched on, and (2) use of automatic protective devices in the circuit to prevent its accidental activation during idle periods. In power-

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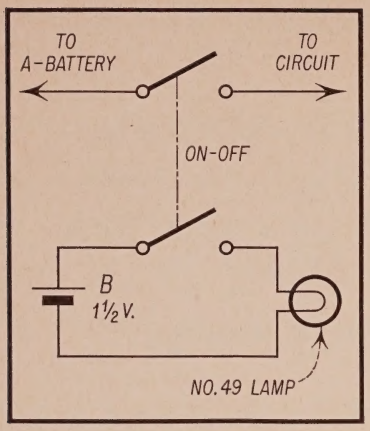

Fig. 1. Use of Pilot-Light Battery.

line-operated equipment, neither of these schemes poses any difficulty in application, since enough extra power is available to operate pilot lights and time switches, and the apparatus cannot be stored in operation, because it first must be disconnected from the power line.

In battery-operated equipment, on the contrary, monitoring or protective devices must draw little or no current for their exclusive operation, otherwise the objective of prolonged battery life will be defeated.

Monitoring Devices

The simplest monitoring device common in electronic equipment and which causes little annoyance to the operator is the pilot light. These lights are absent in so many battery-operated instruments simply because the lamps draw too much current. In some cases, the pilot lamp requires as much current as the instrument circuit itself.

The following paragraphs describe several schemes for operating pilot lights more economically. Several monitoring devices requiring no additional current also are described.

Low-Drain Lamps. Since a large amount of light is not needed, the pilot lamp may be operated at reduced current through a resistor from the A-battery. There is no need, for example, to operate a 6-volt lamp from the 6-volt A-battery. A 5000-ohm miniature wirewound rheostat in series with a 6-volt, 150-ma (brown bead) lamp makes an excellent brightness control. Set this control for the desired brilliance and leave it.

Another scheme is to use the lowest-current lamp. This is the 2-volt, 60-ma (pink bead) type. This lamp may be operated directly from a 1½-volt A-battery. It may be run also from higher-voltage A-batteries, provided the following values of series resistance are inserted: 7½ v, 92 ohms; 6 v, 67 ohms; 4½ v, 42 ohms; and 3 v, 17 ohms.

Lamp With Separate Battery. A pilot light may be operated from a separate battery. Figure 1 shows this scheme. A dpst ON-OFF switch is employed in the instrument and one section handles the lamp circuit. A No. 49 lamp (2 v, 60 ma) is used with a 1½-volt Size D flashlight cell. This is an economical arrangement, since the Size-D cell will operate the No. 49 lamp **continuously** for approximately 40 hours on an 8-hour-per-day basis. This is a much more severe drain than

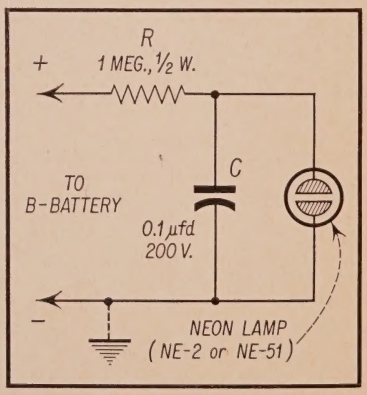

Fig. 2. Flashing Neon Pilot Light.

that encountered in the normal intermittent use of an instrument.

Neon Pilot. A low-power neon lamp makes an excellent pilot light which can be operated from the B-battery in an instrument. Types NE-2 and NE-51 are rated at 1/25 watt. Type NE-2 is a miniature pigtail-type, and Type NE-51 has a bayonet base. Without external resistors, these lamps may be operated from a d-c source as low as 60 v and they draw approximately ½ milliampere.

Flashing Neon Lamp. A flashing lamp is a good attention catcher. A neon pilot lamp can be made to flash by connecting it in a simple resistance-capacitance oscillator circuit operated from the B-battery in an instrument. Only one capacitor and one resistor are required to complete the circuit.

Figure 2 shows the flashing-lamp circuit. The flashing rate is governed by the R and C values and by the applied d-c voltage. With R 1 megohm and C 0.1 microfarad, as indicated in Figure 2, one flash per second is obtained when the d-c supply is 67½ v, 2 per second for 90 v, and 5 per second for 135 volts. At any voltage level, the rate may be increased by decreasing resistance R, or may be decreased by increasing R.

This type of pilot places very little drain on the battery, since the lamp is off at least half of the time. It has the slight disadvantage, however, that its on-off action sometimes generates an interfering noise pulse in sensitive instrument circuits.

Output Meter as Pilot Indicator. In battery-operated oscillators and signal generators, an output meter will serve as a pilot device to warn that the instrument is switched-on, as well as filling its primary purpose of indicating signal output levels. Its particular advantage as a monitoring device lies in the absence of any power demand for the monitoring function.

The output meter therefore should be incorporated in all battery-operated generators whenever there is room for it. In most instances, a simple germanium diode-type meter will suffice. This instrument has the advantage of wide frequency response, being operable from r-f as well as a-f sources.

Figure 3 shows the circuit of a basic af-rf output meter. A 0-1 d-c

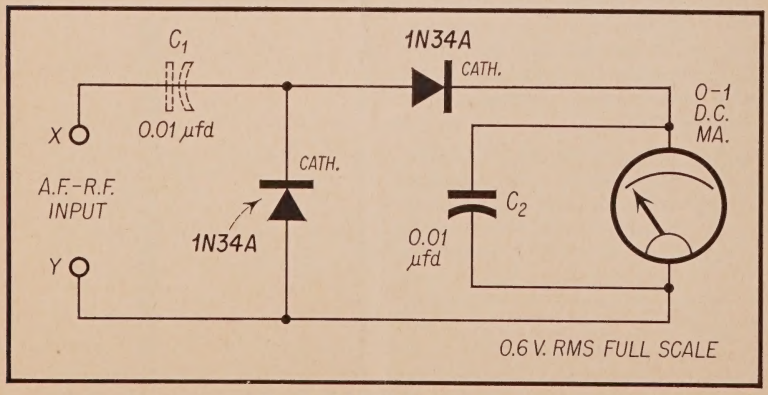

Fig. 3. AF-RF Output Meter.

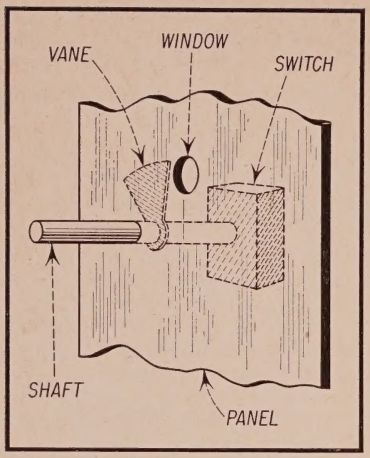

Fig. 4. Switch Flag

milliammeter in this setup gives full-scale deflection for an applied signal-input voltage of 0.6 v rms. Increased sensitivity may be obtained by substituting a d-c microammeter for the milliammeter. Suitable multiplier resistors may be connected in series with input terminal **X** to increase the voltmeter range.

When the generator output contains a d-c component, a blocking capacitor, C_1, must be inserted into the circuit to prevent erroneous deflection of the meter and possible damage to the diodes and meter.

Plate Milliammeter as Pilot Indicator. Like the output meter, a d-c milliammeter in series with the B-plus line of the instrument circuit will serve as a pilot device without demanding any current other than that already flowing in the circuit. In addition to warning that the instrument is in operation, this meter will give a continuous, rough indication of the condition of the batteries.

Switch Flags. Attention-catching, non-electrical devices to warn that an instrument is switched-on can be made quite simple. Although they usually are not as forceful as lamps, they provide an alternative in those instances in which any additional current drain is prohibited. One of the most effective of these devices is the **switch flag.**

Figure 4 shows how a flag may be attached to a rotary-type ON-OFF switch. The flag here is a small triangular vane of metal, plastic, or paper colored to contrast sharply with the shade of the instrument panel and mounted on the shaft of the switch. The switch must be recessed behind the panel to employ this scheme. The vane stands behind a small window hole in the panel when the switch is in its ON position, and is clearly seen. It is shifted away from the window, as it appears in Figure 4, when the switch is at OFF.

Another type of flagging which is applicable to the toggle switch is illustrated by Figure 5. A strip of the phosphorescent adhesive tape ob-

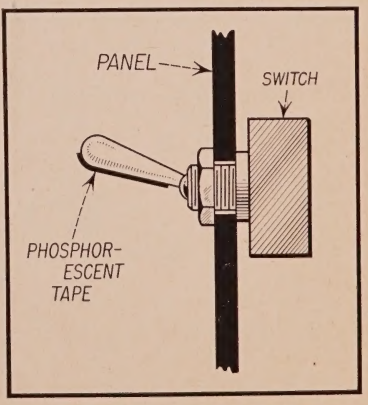

Fig. 5. Glowing Switch Marker.

tainable from automobile accessories stores is applied to the under side of the lever of the toggle switch. When the switch is thrown to its upper ON position, this tape is exposed and readily attracts attention by its bright glow. When the switch is thrown to its lower OFF position, the tape is completely hidden. Even in moderate room lighting, this gives the illusion of a glowing pilot lamp.

Protective Measures

Lid-Operated Switch. Figure 6 shows an arrangement in which the ON-OFF switch is thrown to its OFF position automatically when the cover or lid of the instrument is closed. This makes it impossible to store the instrument "live" unless the cover is left off.

For this application, the switch must be of the **pull-on** type. A short post is attached to the inside of the lid directly opposite the switch so as to press down on the latter and throw it to its OFF position when the lid is fastened in its closed position. With a little ingenuity, a tapered post may be arranged to throw a toggle switch.

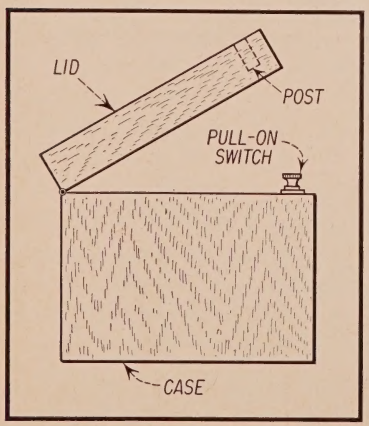

Fig. 6. Lid-Operated Switch.

This system presupposes that the cover is replaced on the instrument after usage. But this usually is true only when the instrument is returned to the shelf. When an instrument is left in a test setup overnight, covers ordinarily are left off.

Time Switch. A small timer, driven by mechanical clockwork, for switching-off batteries after a reasonable operating time is invaluable. A number of years ago, such timers were common but today are not as readily obtainable as the electric-clock type. When suitable machine shop facilities are available, a mechanical timer may be made from a small clock and installed in an important battery-operated instrument.

Immediately after the instrument is placed into service, the timer is set for an interval of 1, 2, or 3 hours, at the end of which it automatically will open the battery circuit. If the test runs for a longer time, the timer can be re-set. If the operator forgets to switch the instrument off at the end of the test or day, the timer will do so automatically a short time later. While some overdrain results, since the timer keeps the instrument running until automatic shutoff occurs, it is not nearly as injurious as having the batteries completely exhausted from a prolonged drain.

Fusing. While well-designed line-operated equipment always is adequately fused, battery-operated apparatus seldom is. Fusing is essential in battery equipment, however, since internal

short circuits not only burn out batteries quickly but often cause them to leak as well.

Miniature, instrument-type fuses for protecting B-battery circuits (plates, screens, etc.) are available in ratings from 2 to 62½ milliamperes. Similar fuses of higher rating are available for protection of A-battery circuits, the value selected depending upon the number of filaments operated. A suggested rule of thumb is to choose a current rating equal to twice the normal, total filament current drain.

Transistorization of Circuits

A very effective way to reduce current drain in battery-operated equipment is to transistorize the circuitry. Admittedly, not all circuits are amenable to transistorization; but wherever possible in the design of new battery-operated equipment, transistors should be used.

Some transistorized circuits, especially those employing only one or two transistors, draw such a small amount of current that they may be left running (either intentionally or accidentally) for long periods of time without materially reducing the normal service life of the battery. Some designers have questioned the necessity of an ON-OFF switch in such circuits.

A further advantage of transistorized circuits is their low voltage requirement. This means that satisfactory operation often is obtainable with one or more inexpensive flashlight cells. Single-battery operation is still another advantage.

Some idea of the application of transistors to familiar instrument circuits may be gained from the following articles in previous issues of the C-D CAPACITOR: **Simple Signal Injectors,** December 1953; **Transistorized Amateur Field Strength Meter,** October 1954; **Special-Purpose Transistor Circuits,** February 1955; **A New, Sensitized Grid-Dip Adaptor,** August 1955; **Transistorized Intercom,** June 1956; **A New Modulation Meter,** October 1956.

Storage Batteries

Miniature, storage A-batteries have been used in some battery-operated equipment, especially when high-current filaments are employed. These units have the obvious advantage of being chargeable. The small storage battery is very familiar in portable, electronic photoflash units. However, there is at present no comparable midget storage B-battery. The A-battery solves only half of the problem.

The packaging of instruments employing storage batteries must offer adequate venting, in order to circumvent the corrosive effects of fumes generated by the battery. The battery construction must be such that the electrolyte will not be spilled when the battery is tipped from its vertical position.

REFERENCES

1. **The Radio Engineering Handbook,** Keith Henney (McGraw-Hill Book Co., Inc., New York, N. Y.), 3rd Edition, pp. 468-480.

2. **Monitoring Battery Instruments,** Rufus P. Turner, RADIO-ELECTRONICS, June, 1952, p. 38.

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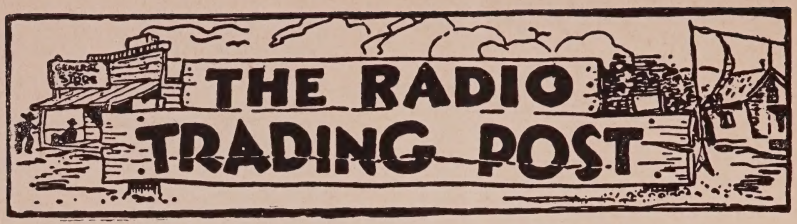

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FOR SALE — RCA Victor TS 630, complete in excellent cond., $15; RCA TV chassis TC 166, less tube, $5.00; battery charger, 10 amp, 6 v., l. n., Sear's make, $10. John Kozma, 12450 NW 5th Ave., Miami 50, Fla.

WANTED — Gonset 2-meter VFO and 2-meter R. F. linear power amplifier. M. Freedman, 3 Channel Dr., Great Neck, L. I., N. Y.

FOR SALE — Hallicrafter S-39 Sky Ranger, 4-band, instruction book, requires work, $10; National 1-10 rcvr, instruction book, coils incl., not working, less power unit, $10. John J. Burke, 53 W. Center Ave., Maple Shade, N. J.

FOR SALE — Precision E-200-C sig. gen., used very little, $35. S. Sand, 262-31 60th Ave., Little Neck, L. I., N. Y.

SELL OR TRADE — Electro-Voice UHF TV converter, 2 tubes, 6BC5, 6AF4, crystal 1N72. Ralph Miller, 7 Lorne St., Dorchester 24, Mass.

WANTED — Mobile converter or rcvr in good cond., state frequency range, price. R. W. Spradling, P. O. Box 871, Joliet, Ill.

WANTED — Power converter — 6 or 12 v. DC input, 110 v. AC output, 100 w. minimum. Walter Bruskiewicz, 5536 Wilson Ave., Chicago 30, Ill.

FOR SALE — A-1 cond. Precision 612 tube checker, $65; Approved RF sig. gen., $10; Eico 615 VTVM, $15. Saul Lustberg, 2333 63 St., Brooklyn 4, N. Y.

WANTED — Surplus BC 312, 342 or 348 rcvr; BC 221 freq. meter. Have for sale 7 and 10" tele-rcvr in good cond., $25. Al Livingstone, 12-01 Ellis Ave., Fair Lawn, N. J.

WANTED — RF, ant. mixer coils for Wilcox CW-3 or F-3 rcvrs. State cond., freq., and price. Richard W. Buxton, 371 So. 7 St., Newark 3, N. J.

FOR SALE — Crestwood tape recorder — model 401, $115. Edw. Dlouhy, 29-49 33rd St., Astoria, N. Y.

FOR SALE — Heathkit 3" scope, excellent, $25, T3 signal tracer, $20, and PS 3 power supply, $25. Robert Fellows, Caledonia, N. Y.

FOR SALE — Skyrider Defiant SX-24, less speaker, good cond., $55 FOB. Robert J. Ray, 4108 4th St., NW, Canton 8, Ohio.

FOR SALE — Complete 21-tube GE 2-meter mobile system, 15 w. at 147.3 mc, 6 v., good cond., $125 plus postage. K. Uran, 2550 Park St., Terre Haute, Ind.

FOR SALE — Heath LP-1 lin. pattern generator, factory adjusted and improved with external sync. term. and lead. Used 2 or 3 times, $25 prepaid. Elton Hoornstra, 305 Ann St., Sault Ste. Marie, Mich.

TRADE — Astatic AT-1, perfect cond., and Regency TV boosters. Want a tenna rotor or what have you? Clarence E. Kelly, 214 West Market St., Blairsville, Pa.

SELL OR TRADE — Sonar MK-3, 10, 20, and 75 meter rcvr, eight tubes plus power supply, 6 v., $30 or trade for 3 x 5 press camera. Melvin Weimeister, 617 N. Court St., Howell, Mich.

FOR SALE — New Cleveland Inst. FCC license correspondence course, sections 1 and 2. Best offer. H. Gehring, 1200 Stockwell Blvd., El Paso, Tex.

FOR SALE — Radio rcvr BC-342 N in good working cond, complete with speakers, S-meter and Tech. Manual, $55. E. H. Kuhlins, 336 Lake Ave NE, Massillon, Ohio.

WANTED — Precision 910 tube tester in good cond. State cond. and price. W. C. Engel, Box 106, Finley, Ind.

SELL OR SWAP — NRI Radio and TV course for U.S., or Israel stamps, or cash. Also have radio and electronic magazines. Kenneth S. Rhoda, 1676 Seymour Ave., Utica 3, N. Y.

FOR SALE — Gonset tri-band converter for 10, 20, and 75 with steering post mounting bracket, plus 12 v. conversion, $25. Want antenna bridge, Nullen 90672; 100 kc crystal. Louis Tonik, 1505 N. Sixth St., Philadelphia 22, Pa.

FOR SALE — Power supply, 2000 v. for 813 xmitter, best offer above $75; 813, 817, 866A tubes and misc parts for 813 amplifier. Armond Henke, Box 84, Port Townsend, Wash.

FOR SALE — Weston analyzer 981, type 3, l. n., $100; Sylvania 220 portable tube checker, l. n., $75. Peter Loden 8749 Crispin St., Philadelphia 36, Pa.

TRADE — Heath BE-2 6 v. power supply and VTVM V-6 with high volt. probe, good cond., for Sam's Photofacts, l. n.; or 14" TV up. Lenwood Martin, R. 2, Box 420, Bassett, Va.

FOR SALE — Motorola FMTRU xmitter complete with 6 v. dynamotor 100-152 mcs.; 50 feet RG-17U cable; 2 KVA isolation xformers; Coyne Applied Practical Radio-TV Vol. 1-5. H. A. Galbraith, 1214 So. Alvord Blvd., Evansville 14, Ind.

FOR SALE — Two Field Strength Meters, $45 ea.; RCA Sweep gen., $85; Beta Elec. Microamphere Meter Full Scale 0-1, $45; constant volt 250 w. xformer, $10; many other meters. J. Boehm, 3534 N. Narragansett Ave., Chicago 34, Ill.

SELL OR SWAP — For Radio equipment, tower, etc., complete dark room, Omega D II, etc.; 6 v. Carter magnemotor; BC348R (conv.). W. T. Clark, Frances Dr., Greenwood Hills, Harrisburg, Pa.

WANTED — Excellent used test equip., local. Interested in swapping high power finals for 6146's. Bill Welsh, 1228 Cambridge St., Cambridge, Mass.

WANTED — Heathkit 3" scope, assembled or not, but working, for cash or have assorted items to swap. Milo G. Burston, 320 Tawas St., Alpena, Mich.

SELL OR SWAP — Heath TS-2 sweep gen. for $15 plus shipping, or swap for 5AXP4 test pix tube. A. Adams, 719 Park Ave., Williamsport, Pa.

WANTED — Commercial TV Booster, must be reasonable, will accept if minor repairs needed. Edw. Mandich, 2200 Bowman Ave., McKeesport, Pa.

FOR SALE — Dumont 208-B scope VG, $55; SX42 VG, $92; BC-348 J manuals, $2. Want RCA VTVM. W. H. Strader, 53 Burdsall Ave., S. Fort Mitchell, Ky.

WANTED — Recent NRI course in appliance training, 15-25 w. speaker driver. P. V. Radio, Box 376, Armstrong, B. C. Canada.

WANTED — Projection TV assembly with necessary mirrors, lenses and tubes. Prefer one in working order, and cheap. D. Gustofson, R. 6, Box 560, Duluth 4, Minn.

SELL OR SWAP — Like new Heathkits: T-3, BE-4, V-6, SG-8. Want Watson Developer, 35mm Robot Hi-power scope, Keystone A-82. H. E. Denny, 10 Portersville Rd., Washington, Ind.

POSITION WANTED — Electronic technician, 14 years experience, and First Class Radio Telephone Operators License as technician, operator, or maintenance. Will consider other locations. Salary open. Harry Hatfield, 68 Sea Cliff Ave., Glen Cove, L. I., N. Y.

WANTED — TS4 Heathkit TV gen., Linearity pattern LP1 Heathkit gen., Telerotor. T. A. Bergman, H. A. Lorenzstraat 84, Den Helder, Holland.

FOR SALE — Radio Craftsman AM-FM tuner, incl. pre-amp, l. n., $50. G. E. Buske, 717 Moores River Dr., Lansing 15, Mich.

FOR SALE — RCA 9-PC-41 Projection TV, massive mahogany console, $50; must be picked up. Also Emerson 602C table FM rcvr, 6 tubes,$8. N. B. Wynnick, 55 Prospect St., Ansonia, Conn.

FOR SALE — Amateur station complete: B and W 5100, 51SB, antenna match, Micro-Match, Monotone, Turner 81 Mike, RME Clipper, Dummy ant. Gonset beam with C-D rotator, Hallicrafter SX96, $1,000 FOB. L. J. Yuhl, 226 Violet Ave., Floral Park, N. Y.

WANTED — Tubes: receiving, TV, Radio, special purpose tubes out of equip., etc. Specify all details. Jet Lectronics, 188 Bergen Ave., Kearny, N. J.

SELL OR TRADE — RCA Rider chanalyst; Supreme 661 sig. gen.; NRI Triplett all-wave radio servicer; 21" Muntz TV; C-D BN capacitor bridge. Want Sam's folders; RCA senior voltohmyst, in-circuit capacitor checker. Claude W. Basham, Box 213, Peterstown, W. Va.

FOR SALE — Hallicrafters SX-25, $70; National NC 57 rcvr, $40; Johnson 122 VFO, $28; RCP 25000 OPV multimeter, $15; Harvey-Wells APS50 power supply, $18. G. Samkofsky, 201 Eastern Pkwy., Brooklyn 38, N. Y.

WANTED — To contact anyone who has built R-C-L bridge as described in Nov. 49 Capacitor. George A. Masden, 717 Lincoln St., Mt. Pleasant, Iowa.

FOR SALE — Eico 625 tube tester with case, $25; VTVM 232 precision aligned, $35; sig. gen. 322, l. n., $23. All with test leads and fuseplugs. Weston Herrick, R.1, Milford, N. J.

WANTED — Polaroid Camera model 95A. Have tube tester, light meter, Triplett VOM, Eico 5" scope to trade. Karl G. Muck, R. 2, Warsaw, N. Y.

SWAP — RCA 45 record attachment; 6X30 binoculars, pigskin case. Want radio and TV textbooks, or late radio correspondence course. Will buy hi-fi amplifier, other hi-fi equip. Jack Wentworth, 4269 Packingham Dr., Springhill, Ala.

WANTED — Electric motor for record turntable for Soundscriber R-R1100, in good cond. and low priced. Frederick R. Shutt, 612 Frantz Ave., Mullens, W. Va.

SELL OR SWAP — Bendix TA-12 xmitter; BC-189A rcvr with P.S.; Astatic Carbon Mike 11M5, National tank coil MB150, Kenyon and Freed outputs. Need xtal mike, Millen 90811, P.R. xtals for 40 and 80 meters. Peter Mendez, 3655 Locust Ave., Seaford, L. I., N. Y.

SELLING OUT — TV service equipment and manuals. Send stamped self-addressed envelope for list. L. Miller, 417 Wagner Ave., Washington, Ill.

SELL OR TRADE — NRI advanced TV course (kits and manuals). Want test equip. Don Meek, 210 N. Rock, Sheridan, Ark.

FOR SALE — Simpson 383-A Capacohmeter, incircuit capacitor checker, perf. cond., real bargain at $75. R. S. Krebs, 1739 E. Susquehanna St., Allentown, Pa.

FOR SALE — Hallicrafter S40B rcvr, in excellent cond., $65. Claude's Radio and TV Service, Box 213, Peterstown, W. Va.

FOR SALE — McMurdo-Silver 701 xmitter 6-80 meters, two sets of coils for all bands, instruction book, exc. cond., $25 plus postage. W. J. Reinstadler, 170 Cemetery St., Archbald, Pa.

SELL OR TRADE — HQ 129X rcvr, needs alignment and minor repairs, $85 or test equip. Henry Gauntt, 850 Wren Ave., Miami Springs, Fla.

FOR SALE — BC-348 rcvr 150 Kc-500 Kc. Rewired for 110 v. AC operation with power supply. Any reasonable offer accepted. Daniel Epstein, 5411 Fort Hamilton Pkwy., Brooklyn 19, N. Y.

SELL OR TRADE — Philco's latest "Color Television," simplified theory and service techniques, unused, $3 mailed insured, or swap for crystal mike in good cond. R. Frohwerk, 4330 S. E. Woodward St., Portland 6, Ore.

FOR SALE — Unused NRI 34 sig. tracer, 88 sig. gen.; 69 tube tester; multitester; 40 Sams in binders; Riders Vol. 17 l. n.; tubes, resisters, condensers, etc., $250 takes all. Robert Garrison, 14800 Martell, San Leandro, Calif.

FOR SALE — Heavy-duty antenna rotator with special heavy-duty Raytheon 25-30 v. xformer, $20; K and E polyphase slide-rule in hand-sewn leather case, l. n., $10. Prefer local buyer. M. Klayman, 796 New Jersey Ave., Brooklyn 7, N. Y.

SELL OR TRADE — Meters, multitesters, parts, hand tools. Want scope, FM ..and SW. rcvrs, test equip. Roby, 2422 No. Halsted St., Chicago 14, Ill.

FOR SALE — Precision 912P Electronamic tube tester, mahogany case, modernized, newest chart, $25 FOB; Lear RM402C Learavian, (AC-DC or battery), tunes aircraft, marine broadcast, very good, $25 FOB less battery. Hal Magargle, 38 Bluebird Dr., Syosset, N. Y.

FOR SALE — Emerson 747 pocket portable radio, instruction manual, less batteries, $15. Ray Langlois, 1448 Randall Ct., Los Angeles 65, Calif.

FOR SALE — RCA Victor TV, 7", $15; Webster automatic record changer, 78 RPM, $7.50. Ray Radio, Box 595, Lancaster, Ky.

FOR SALE — Collins 32V3 xmitter, $500; RME Speech Clipper, $35; National grid dip meter, $40; Johnson Matchbox, $35. All like new. Bill Tucker, 456 Colonial Ave., Union, N. J.

SELL OR SWAP — BC-221AH and Navy LM-5, same frequencies, $75 each; telephone control unit RM-13J, $20; R-9 APN-4 rcvr, $10; Bogen 600 intercom-six stations, l. n., $65; R-8 ARN-8, $12.50. Need ham gear. Bill Slep, Ellenton, Fla.

WANTED — All test leads and attachments for RCA 162C chanalyst radio tester, instruction book. O. C. Vidden, Fertile, Minn.

FOR SALE — 16mm sound projector; Troubleshooter book (old); 25 v. tube tester. E. Reeser, R. 2, Wichita, Kan.

SELL OR TRADE — Collectors item in good working cond. RCA Radiola 60 AC and 103 Loudspeaker (about 1926). Best offer. H. R. Ringold, 132 N. Doheny Dr., Beverly Hills, Calif.

FOR SALE — Tektronix 5" scope 545 with plug-in preamp; Hewlett-Packard 608A sig. gen.; Polytecnic 902 broadband microwave sig. gen.; Ballentine 305 VTVM; 20 amp Variac (V-20M). B. N. Gensler, 63 East 9th St., New York 3, N. Y.

FOR SALE — Tape recorders, xmitters, rcvrs, Hi-Fi amplifiers, speakers, transistors, police and fire radios. Spera, 37-10 33 St., Long Island City, N. Y.

FOR SALE — Hammarlund HQ 140-X. Best offer over $175. Used approximately 10 hours. Washington, area only. John P. Lawrence, 14 "L" Laurel Hill Rd., Greenbelt, Md.

FOR SALE — Sonar SRT 120 with VFO, $100; Meissner ex sig. shifter, TVI proof, $30; Millen R9'er, $15; Viproplex bug, $9; 813 TVI proof final, $40. Want Millen power supply. Joseph B. Forman, 186 Joralemon St., Brooklyn 1, N. Y.

FOR SALE — 2-meter Gonset communicator, $125; and Beam, $25; Viking Adventurer, $45; BC348 modified, $75; RME converter 6 and 10 meter, $20; Windam antenna and Balun coils, $10. Jerry Weissner 3 Crest St., Croton-On-Hudson, N. Y.

FOR SALE — Kohler light plant 800 w., 115 v. 60 cy., l. n., $165. Want appliance service books, TV test equip. and recent info. Modern Electric Sales Service, 117 E. Bellville, St., Marion, Ky.

TRADE — RTA-1 aircraft unit, other aircraft surplus gear, RCA TV camera, for 75A4 or equal communications rcvr, Hi-Fi gear. Jack Barnes, 5 Highfield Lane, Nutley, N. J.

WANTED — Pair of Handy-Talkies, l. n., surplus or commercial. Warren L. Pearl, 1012 1st Ave., Seattle 4, Wash.

FOR SALE — Folded exponential horn, 18" x 18" x 36"; driven by 2 Jim Lansing 208's and University 4401, with cross-over and attenuator, custom finished in cork, $100. Rick Gould, 851 N. Beverly Glen, Los Angeles 24, Calif.

WANTED — Tape recorder in A-1 cond.; also dry cell battery eliminator. Roy Goodwin, North Dr., R. 1, Benhill Station, Atlanta 11, Ga.

FOR SALE — B and K 500 tube tester; Heathkit: TS-2 TV sweep gen., and model 0-8 scope. Best offer, C.O.D. Gregory Constantino, 315 Fulton Ave., Waukegan, Ill.

SELL OR SWAP — Heath VM model AV-2 and portable tube checker TC-2, less than year old, for cameras or guns. E. L. Stohl, 283 20th Ave., San Francisco 21, Calif.

SELL OR TRADE — Heathscope 0-10; Heath VTVM V-6; Knight PA amplifier, Motorola RC-36A record changer. Trade FM tuner, Hi-Fi amp., preamp. Monte Lum, 714 W. Oakdale Ave, Chicago 14, Ill.

WANTED — Instruction manual for "Ferret" 720 sweep gen., made by Coastwise Electronics. Jerry Gordon, KETC, Channel 9, St., Louis 5, Mo.

FOR SALE — UTC S22 250 w. modulation xformer, $21; PE-103A, $25; Johnson 50DD90 xmitting condenser, $7; three 810 tubes, $8 ea. or $21 for 3. C. Borysevich, 1066 President St., Brooklyn 25, N. Y.

WANTED — Coils for HRO rcvr. State available bands, HRO model number and price. J. L. Smith, 4147 Normandy Ave., Dallas, Tex.

FOR SALE — Mallory 6-12 v. battery eliminator and charger, l. n., $20, shipping weight about 13 lbs. David Friedman, 1562 E. 16th St., Brooklyn 30, N. Y.

SWAP OR SELL — QST issues, back to 1924. Want prop pitch motor, or 4-125X tube. H. F. Bates, 10 Beaver Dam Rd., Stituate Harbor, Mass.

SELL OR SWAP — Transistor test oscillator, 455-600-1000-1600 kc., modulated or not 22½ v. operation, l. n., $9 cash or unused standard tubes, of my choice. C. Elgasser, 1920 Fern St., San Diego 2, Calif.

FOR SALE — Loktal tubes in Manuf. original carton: 1-3-5-7-14-35-50, 50 cents each. Give 1, 2, 3, choice. John Furey, 807 Reed St., Olean, N. Y.

FOR SALE — H. H. Scott Dynaural noise suppressor, type 114A, l. n., $25. J. H. Geddes, 78 Birch St., Floral Park, N. Y.

WANTED — 30-50 mc. FM mobile rcvr 6 v. single freq. or transceiver for same band, for cash. Frank Ainoris, Lincoln Ave., Holbrook, L. I., N. Y.

FOR SALE — Back copies of Radio Electronics and Radio and TV News; Sam's PF Index and Technical Digest, Aircraft manuals. Louis Porsetsky, 137-16 169 St., Jamaica 34, N. Y.

FOR SALE — Oldsmobile and Pontiac auto Radios; used AC-DC table model and some old-time radios for cabinets; used tubes, 35 cents ea. postpaid. Goldstone Radio, 1279 Sheridan Ave, Bronx 56, New York, N. Y.

WANTED — Large quantity of recording tape, telephone answering machine. Dick Lackner, 2229 Bradley, Chicago 18, Ill.

WANTED — GE portable radio (batt. AC-DC) model 250 and 260. Working order or not. Give description and price, also 262 kc. output trans — sec. — CT in small quantity. G. Kusse, Box 191 Beverly Shores, Ind.

FOR SALE — Crystal sets, transistor radio, sign painters letter patterns, metal locator, used tubes. John Haynes, Doe Run, Mo.

WANTED — 25 or 30 w. amplifier, two parabolic baffels for 12" cone speakers, 16 mm. movie projector. Have cash and many unused TV test instruments. John Arnold, West Wilson St., Bluffs 3, Ill.

WANTED — Good communications rcvr; and good all band xmitter for cash. Wm A. Zuehlke, 3799 Medina Rd., Akron 13, Ohio.

FOR SALE — RCA W0-56A scope, l. n., cost $275. Make offer; 2 UHF converters and 2 indoor UHF aerials, $25. Bud's TV, 5912 Hampton Blvd, St. Louis 9, Mo.

SELL OR TRADE — Elliot-Fisher 12 register bookkeeping machine, 3 by 4 console projection TV, excellent cond. Carnegie Electronics, 289 West Ave., Pawtucket, R. I.

FOR SALE — Comm. rcvr, $100; VOM, $20; VTVM, $24; scope, $95; sw gen., $75; MKR gen., $85; 45 RPM attachment, $7.50; tube checker, $50; Philco 200X conv., $20. J. Pellock, Benld, Ill.

WANTED — Extended range 12" speaker, like GE 1201-A; output xformer for push-pull 6V6. Have Electro-Voice 915 microphone with 8" desk stand, both chrome-plated; T-17 microphone, and-or cash. C. Gabler, 1307 Merriam Ave., New York 52, N. Y.

FOR SALE — Audax reluctance pick-up L-6 with both needles, slightly used, $12. G. Porreca, 7302 Riggs Rd., Apt. 106, Hyattsville, Md.

WANTED — ARC3, ARC1, ART13, BC312, 348, 342, 788, TS173, 174. Advise price and cond. George Pasquale, 9421 Thornhill Rd., Silver Spring, Md.

WANTED — Directions for a Triple TT combination-tester, model 1183-SC. Radio Service, 2401 Hiawatha Pk., Columbus, Ohio.

FOR SALE — Viking Adventurer, Knight VFO, Eldico AM-40 modulator, all wired and tested, good cond., FOB. Bud Maxwell, 2840 Ellwood Rd., New Castle, Pa.

SELL OR TRADE — Superior Super Meter, $20, or want 2 hp. motor rated at 3600 rpm or 1800 rpm; teletype manuals, operator's control box for a GP-7 xmitter. Robert J. Reidy, 1307 Nelson Ave., Bronx 52, N. Y.

FOR SALE — RME Radio frequency amplifier and preselector DB-22A, $45; Hallicrafter Skyrider, Panoramic model SP-44, $50; Budd FCC-90 frequency calibrator, $5. C. L. Gemmill, Box 3254, University Station, Charlottesville, Va.

FOR SALE — 2 WW-II, BC-222 xmitter-rcvrs, 28-52 mc., A-1 cond., less batteries. Highest offer. Mr. B. J. Desind, 2458 Shirley Ave., Baltimore 15, Md.

FOR SALE — Vibrator power supply PP-39A or TRC-2 for radio SCR-694-C, complete with cables and carrying case. Best offer. Morris E. Jacobs, 371 East 179 St., New York 57, N. Y.

WANTED — Audio sig. gen. State age, make, model, and price. James R. Word, 506 E. Lincoln Ave., Milwaukee 7, Wis.

TRADE — Pilotuner T601 FM; radio tubes, for HO or OO railroad locos or trolleys. David V. Chambers, Harrington, Del.

FOR SALE — RME-50 communications rcvr NBFM xtal filter, separate speaker, bargain at $100. Paul Vurpillat, 2102 Cedar St., South Bend 17, Ind.

WANTED — Armed forces technical manuals, all subjects; writers of articles on chemistry, radio, TV. John Skane, Halifax-1, on Route 225, Pa.

TRADE — 0-7 Heathkit 5" scope, for communications type rcvr. L. D. Ewy, 3216 S-W 65, Oklahoma City, Okla.

WANTED — For Weston 772 analyzer, model 666 selector block and set of skirted adapters. W. Honetzy, 529 Pacific Ave., Pittsburgh 21, Pa.

WANTED — Table model cabinet for model 622 Stromberg-Carlson TV. Col. G. T. Mackenzie, 7130 S.W. 92nd St., Kendall, Fla.

FOR SALE — Like new Hi-Fi, Pilot 901, 30 w. audio amp., $60; Pilot 824 AM-FM tuner, $90; GE coax speaker, A1400, $30; GE enclosure, $40; Garrod changer mag. cartridge needle, $40. S. Lustberg, 2333, 63 St., Brooklyn 4, N. Y.

FOR SALE — Variable voltage power supply, model PS-2 Heathkit, used in testing or supplying power to battery-operated radios, $30. Frank R. Leslie, 26 Valley View Dr., Dayton 5, Ohio.

FOR SALE — Central Electronics SS75 exciter, $80. Lewis C. Benty, 956 W. Belmont Ave., Chicago, Ill.

SELL OR TRADE — Hallicrafter S72 rcvr, $45, or trade for test equipment. Michael Oles, 4252 N. Marmora Ave., Chicago 34, Ill.

WANTED — "Transactions of the Contra-Polar Energy Commission"; vol. 6, p. 5 (1918), vol. 23, p. 1201 (1935) of IRE Proceedings, and any books on light-beam communications and ultra-sonics. W. Adamonis, 7 Milton Ave., Dorchester 24, Mass.

FOR SALE — Filter-Limiter and power supply, July '56 CQ, $8; Product Detector, for HR050, November '56 CQ, $5; meters and tubes. Robert G. Wilson, 139 Campbell Ave., Havertown, Pa.

FOR SALE — Heathkit VTVM V4A with dc Isolating Probe, $25 FOB; 3" RCA scope model 155A, $40 FOB. W. Levine, 216-69 68 Ave., Bayside 64, N. Y.

TRADE — A year and a half Radio and TV theory course, for any known FCC preparation course. Jacob Gowlus, 75 E. 95 St., Brooklyn, N. Y.

WANTED — Coil sets: E, F, G, H, and J, for National HRO-7 rcvr. State price and cond. P. G. Prater, Box MC-267, Seaford, Del.

SELL OR TRADE — Standard coil strips: 13 pairs Channel 7-H, 4 pairs Channel 7-Q, all l. n. Need tube checker with roll chart. R. P. Frohwerk, 4330 SE. Woodward, Portland 6, Ore.

SWAP — Mon-Key for radio electronic, or photo equip. Have Argus C-3 camera. Mitchel Katz, 147-11 76th Ave., Flushing 67, N. Y.

SELL OR TRADE — 10" wood lathe. Want 110 v. AC lite plant and VOM-meter. G. L Shriver Sr., Rt. 1, Ridgeley, W. Va.

WANTED — Operating and maintenance manual for Solar Exam-eter, model CF. State price. M. E. Turk, 2845 S.W. 42nd St., Oklahoma City 19, Okla.

WANTED — Inverter 6 v. DC to 110 v. 60 cy., 50 w. or more; rack panel for a National 173 rcvr. Jack Miller, 4615 Laurel, Bellaire, Tex.

FOR SALE — AC-operated Instructograph in good working cond., 10 tapes and instruction book, $30 prepaid. James M. Cox, Kirksville, Ky.

WANT — Collins rcvr. Have 3 RCA TV cameras; 1 RTA-1 aircraft communications unit. Jack Barnes, 321 River Rd., Nutley 10, N. J.

ATTENTION — School or industrial laboratory-experimenter Harshaw Scintillation Crystal type X6L2, $70, and RCA 5819 photomultiplier tube to match, $55. Both for $65 or swap for ham xmitter or scope. Morris M. Goodman, 2621-Burns Pl., Union, N. J.

SWAP — Tubes, parts, equip., for tape recorder, 6m. converter, small printing press or what have you? Dick Pfouts, Box, 15, Mt. Victory, Ohio.

WANTED — Old-time long wave loose couplers, (Navy type O.K.). Must tune from 50 kc to 500 kc and be in working cond. Will pay reasonable price. G. A. Schuman, 712 Diversey Pkwy., Chicago 14, Ill.

WANTED — RCA KCS 81 chassis less yoke and Pic tube. Have cash or AC gen. Thompson's Radio and TV Service, Fayetteville, Tenn.

FOR SALE — Philco 937 auto radio, perfect cond., good tone, $10. Milton Leiser, 305 E. Mt. Eden Ave., New York 57, N. Y.

SELL OR SWAP — Factory wired Precise 308 scope, $100; Heath 08 scope with calibrator and cap probe, $50; and misc. equip, for tape recorder, 12 v. battery eliminator, VOM, flyback checker, condenser checker. A. Consiglio, 4615 Furman Ave., Bronx 70, N. Y.

FOR SALE — Hallicrafters SX-42 communications rcvr, excellent cond. Make offer. Want 8 mm projector. Robert H. Schmitt, 2309 Tenth St., Sioux City, Iowa.

FOR SALE — TV chassis; Philco 1001, Olympic 9221, Motorola VT-73, $6 each; Eico 425 scope, $35. H. Bell, 3917 Ely Ave., New York 66, N. Y.

FOR SALE — Dumont 3" scope, 3½ MC bandpass, never used, $100. H. Auerbach, 193-30 Jamaica Ave., Hollis 23, N. Y.

SELL OR TRADE — Misc replacement parts and components for radio or TV Service. Trade for scope, comm. rcvr. Clifton Johnson, 908 E. Grand Ave., Escondido 7, Calif.

FOR SALE — Universal mounting car radio, good oper. cond., $15; BC-457-A, 3-6 mc. with 4600 kc xtal., in carton, $15. R. B. Orford, 7112 N. 2nd St., Rockford, Ill.

TRADE — GE 250 portable radio with self-charging battery, excellent cond., for 6-12 v. battery eliminator, and voltohmeter, battery operated. A. Stellerman, 229 Snediker Ave., Brooklyn 7, N. Y.

WILL TRADE — TV, Radio, or Refrigeration course for lapidary equipment. Fred Vincente, 114 E. 102 St., Apt. 1, New York 29, N. Y.

WANT — Small metal turning lathe, in good cond. Give make, size, and price. H. H. Riley, Rt. 4, Box 346, Aiken, S. C.

FOR SALE — NRI course less kits, 1937, and Triplett 1175-A all-purpose tester. Make offer. Want 12" or 17" TV set. B. E. Johnson, Box 81, Spearfish, S. D.

FOR SALE — Superior TV bar gen., $29; Eico sig. gen. A-200, $25. Both good as new. Pederson TV Radio Service, Walnut Grove, Minn.

SELL OR SWAP — Photofacts 1-4, 8-11, 1. n., $10 each, or $50 for set or swap for ham gear. J. D. Giltner, Jr., 1100 West 2nd., Haysville, Kan.

FOR SALE — Hewlett-Packard 200BR audio osc. (rack mount) $45; Kay electric mega-pipper, $25; RCA capacitance control relay, $20; GE FP-54 electrometer tube mounted in light-proof metal case, $20. Center TV, 106 Center St., Garwood, N. J.

FOR SALE — Heathkit SG-6 sig. gen., $14; sig. tracer T-2, $14; VTVM V-4A Hi- Volt and RF probes, $24. all excl. cond. with manuals. A. S. Johnson, 59 W. 10th St., Hialeah, Fla.

TRADE — Superior TV-40 cathode ray tube tester, used twice, for Eico bar gen. Derry's Radio Shop, King's Mountain, Ky.

WANT — Holmes 12 and Victor 40 16mm sound projectors, any cond. P. Pierucci, 23 Leroy St., New York 14, N. Y.

SELL OR TRADE — Standard coil UHF strips, 42 F-G and 42 Q, $3.50 each. Need VOM, tube checker, tape recorder. E. G. Eckford, 5021 Birkenhead Rd., Jacksonville 10, Fla.

WANTED — Junk Regal 20D31 TV rcvr H. V. compartment must be intact. Tony's TV Service, 57-35 Xenia St., Corona 68, N. Y.

WANTED — Information on how to obtain power xformer for the Solar Exameter, model CF-1-60. Arthur Hubert, 1566 Pleasant St., Fall River, Mass.

TRADE — Mon-key electronic speed key, 5 to 40 wpm, in good working cond. for 630 Triplett or similar multimeter. J. Shinkunas, 215 Myrtle St., Sioux City, Iowa.

FOR SALE — 5" Eico 425 scope and 3" RCA scope. Henry W. Hoffman, 420 Rosslyn Ave., New Milford, N. J.

SELL OR TRADE — Hallicrafter S-72 3-way portable, 4 bands. Interested in small high gain portable radio rcvr. Seymour Cohen, 1440 Crotona Park E., Bronx 60, N. Y.

FOR SALE — Sams Photofacts. 1-200 in hard cover binders. Folders 223-324 in orig. envelopes, $275. Raymond G. Davis, 53 Riverbank Rd., Saugus, Mass.

FOR SALE — Exacta Reflex 35mm, with case and rangefinder; Revere 888 automatic projector, 500 w., 1. n. Make offer. Could use tape recorder. John Erlich, 281 Schaffer St., Brooklyn 27, N. Y.

WANTED — Address of Midwestern Sound System or Tone Master Amp 364 schematic. Grey, 612 Charlotte Ct., Utica, N. Y.

CASH — For Precision E-400, 1. n., and trade for color bar and white dot gen. Gail L. Spane, 612 Maple St., Mount Airy, N. C.

FOR SALE — Simpson 260 in good working cond., $20 plus postage; 1/4" electric drill, model 149, good cond.; "Television Simplified" by Kiver, $1.75. Hy Levine, Box 904, Liberty, N. Y.

SELL OR TRADE — Weston 414 meter, $5; NRI portable VTVM less batteries, $15; tubes. Want sweep gen. State model, cond., price. Toll House, Box 46, West Cornwall, Conn.

SWAP — GE exposure meter, 6 assorted Kodak cameras and filters, photolab outfit. Want late model Hammerlund or National rcvr. T. Giaimo, 1212 Anderson Ave., Palisade, N. J.

FOR SALE — BC522 xmitter and rcvr, both completely converted for 2 meters, $35; BC 474 xmitter and rcvr 75 and 40 phone and CW, 25 w., $40; BC611F Handi Talkie converted to 3920 kc with circuit diagrams, $35. T. Snedden, 785 Euclid Ave., Glen Ellyn, Ill.

FOR SALE — Telectro tape recorder in original carton, several new rolls of recording tape (5" reels). Will take any reasonable offer. Mack O. Santer, 544 East 6th St., New York 9, N. Y.

FOR SALE — Eico 221 VTVM and 320 sig. gen. with manuals. Larry Cooper, 15 East 208th St., Bronx 67, N. Y.

SELL OR TRADE — Ham gear, test equip. Send for list. Les Harry, Box 507, Pinehurst, Idaho.

WANTED — Used communications rcvr in good cond. State model, age, and price. Local preferred. F. C. Bergmann, 80 Columbus Ave., Belleville 9, N. J.

FOR SALE — Hickok 505A oscillograph and 610A TV-FM alignment generator, including all cables and 4500 kc. crystal. Used very little. Will sacrifice both for $200, C.O.D. J. Ignaszak, 5539 S. Aberdeen St., Chicago 9, Ill.

SELL OR SWAP — CREI home study course sections 1, 2, 3; Kennedy 525 intermediate wave rcvr; De Forest D-10 reflex rcvr. Want 3-speed record player. Diamond, 130 Walnut St., Paterson 2, N. J.

FOR SALE — National NC-46 comm. rcvr with matching speaker, $40; Hallicrafters S-20R rcvr, $35; Leece-Neville 6 v. alternator with rectifier and regulator, $30; Norleco projection unit with high voltage supply, $20. Eugene Adams, 755 Dellafield Ave., Staten Island 10, N. Y.

FOR SALE — Complete ICS course in Radio Servicing, 35 Books, $20. Howard G. Newcombe, Box 528, Myrtle Creek, Ore.

FOR SALE — Transmitters, rcvrs, tuners for Aircraft or Amateur, Ship-to-Shore radiotelephone, depth recorders. Lorrillier, 630-641 MacDade Blvd., Collingdale, Pa.

SELL OR TRADE — Rek-O-Kut Challenger, portable disc recorder, no speaker, includes GE cartridge and needles for converted arm, cutting needles and blank discs. Perfect cond., $375 plus freight or Stereo equip. Medway Sound Recording, West Medway, Mass.

FOR SALE — Sam's Photofacts 1-9, and index; RCA Service Notes 1936-1939; Solar CF Exam-eter capacitor analyzer; Hickok 288X sig. gen.; Kreco GP-810 ten-meter ground plane antenna. Larue Abernathy, Batavia, Iowa.

WANTED — Army or Navy BC-221 frequency meter, or equivalent. Advise cond. and price. Subject to test approval. Westlake Marine Service, 3345 Goldengate Ave., Rocky River, Ohio.

WANTED — 7 to 14 mc coil for HRO 5RA1 rcvr, and spare coil holder for same; 2 rf stage regenerative rcvr for covering 10 kc to 550 kc. E. R. Adams, 319 9th. Ave., Haddon Heights, N. J.

TRADE — KW power supply and other Ham gear for tape recorder, 35mm. projector. Prefer local. Frank Martin, 16 Woodbine Rd., E. Weymouth, Mass.

SELL OR TRADE — Unused FCC License Preparation Course for 3rd, 2nd, and 1st Class Radiotelephone License, 30 lessons, $45. Walter P. Ebner, 1813 So. Michigan Way, Denver 19, Colo.

SELL OR SWAP — Precision 920 multimeter and tube tester; Heath AR-2 rcvr, unconverted in dual rack BC 696 and BC 459. Need VFO, ARRL Handbooks, Heath DX 35. C. A. McKay, 4144 Meda Pass, Fort Wayne, Ind.

WANTED — Old radios, parts, magazines, prints, etc., between 1920 and 1926. Must be 1 to 5 tubes, battery models. W. Peatfield, 55 Putnam St., E. Boston 28, Mass.

FOR SALE — Karadio 6 v. DC, 190-420 Kc, 540-1650 Kc, 2.5-6.8 Mc, speaker-power supply, instructions, $50; Hallicrafters S-72 portable, instructions, $60. Don Johnston, 310 West Main, Houston, Tex.

FOR SALE — 13 Motorola control heads and 13 speaker mounting kits, $35; l. n. Hopper's Radio and TV Shop, 301 Hollis St., Framingham, Mass.

FOR SALE — Miscellaneous radio parts, resistors, radios, TV chassis, speakers, testers, and cabinets. Pat McDonald, 195 Prince St., New York, N. Y.

FOR SALE — RCA Broadcast Transcription arm with diamond stylus cartridge, complete with equalizer-filter switch. Will reproduce to 17 inches, vertical or lateral, $40. Extra cartridge with diamond stylus, $20. B. Lombarde, 21 Mt. Wash. Dr., Clifton, N. J.

SELL OR TRADE — 2" Waterman scope, unused Eico kit, unassembled 322K sig. gen., factory reconditioned Precision 832A VOM. J. Prezioso, 423 Fifth St., Niles, Ohio.

FOR SALE — Philco 7050 tube tester l. n., tests 9 pin miniature tubes, $25. Everett Pape, Concordia, Mo.

FOR SALE — Diamond styli for GE triple-play cartridges RPJ-012 and 013, $5 each, in sealed packages. Michael Tuberosa, 50 Barnes Ave., E. Boston 28, Mass.

SELL OR TRADE — Unused L-Dynamotor input 6 or 12-v. output 500 v. for Leica camera. Steward Electric Service, 116 Scioto St., Urbana, Ohio.

FOR SALE — Heath TS-4 TV alignment generator, good working order, $30, or swap for good marine radio rcvr. H. H. Seabrook, 36 Branch Ave., Freeport, N. Y.

WANTED — RCA 6198 Vidicon and the following parts: 216D1 yoke, 217D1 focus coil, 218D1 alignment coil and 233T1 Horz. output xformer. State price. Fred L. Kost, 431 Flamingo St., Philadelphia 28, Pa.

FOR SALE — Zenith Royal 800 tubeless transistor portable radio leather carrying case, batteries, 2 weeks old. Perfect cond., $75 postpaid. No trades. Phillip Lazzio, 406 Maxwell, Lake Geneva, Wis.

FOR SALE — Jackson 650A capacitor analyzer, new cond., $25 takes it. John Endmon, Webster, So. D.

FOR SALE — Gonset communicator, 110 v. AC, 12 v. DC, used 3 hours, $150. R. Stewart, 25-40 30th Rd., Astoria, L. I., N. Y.

FOR SALE — Zenith 6-tube portable AC-DC model 6-G-601M, $10; Silvertone 3451 White table radio manual and push-button tuning, $10. Albert C. Hart, 207 N. Raymond St., Griffith, Ind.

WANTED — Used correspondence course: CREI Specialized Broadcast Radio Engineering, Specialized Advanced Mathematics and TV Engineering or similar courses. Donald Heim, 2450 Pearl St., Dubuque, Iowa.

SELL — SCR-522 xceiver in good cond. with tubes, less crystals, UN modified. I pay postage and insure. Highest offer. Dick Platt, Box 234, Summerland, Calif.

FOR SALE — Meissner disc recorder Radio PA and phono two-speed, $50. J. H. Harrington, 105 Smith St., Brooklyn, N. Y.

FOR SALE — Masco 25 w. amp., $35; Astatic mike JT 30, $7.50; 4-tube Blonder-Tongue TV booster, $12.50; 1. n. 78 rpm record changer, $12.50. K. L. Wein, 3070 Bainbridge Ave., Bronx 67, N. Y.

SWAP — Parts for low-powered power supply; 40 or 80 meter ARC-5 rcvr converted or not; 4.5 mc sound disc I.F. for pr. 866-A tubes; interstage audio for 75 or 100 w. modulator. Samuel John Reed, 2020 E. Turney Ave., Phoenix, Ariz.

WANT — Fisher 80C audio control, professional quality, 3-speed turn-table, Hardtly 215 speaker, 8 mm (Brownie) Movie Camera "Turet", latest test equip. for Radio and TV. Louis Kiraly, Box 50, Kitimat BC., Canada.

WANTED — Narco Ohmni test set; I.L.S. test set; Lampkin VHF generator. Fran-Air Co., 19 Oakwood Ave., Saylesville, R. I.

FOR SALE — Gonset VHF converter with squelch 3015, 108 to 130 mc; Gonset AR-1 VHF xceiver, 1. n. Make offer. Center TV Co., 867 Broad St., Central Falls, R. I.

SWAP — "Precipiton" xformer 115-13,000 v. with center tap on high side, for intercom set. L. S. Cunningham, 8315 Banbury St., Cincinnati 16, Ohio.

SELL OR SWAP — QST's 1932-'47 complete; odd copies CQ and QST 1946-'51; ARRL Handbooks 1942-'47; Viking II, VFO, L. P. filter; SX71 rcvr; Shure S55 mike for cash or autos, lamps (brass), horns, license plates before 1920. Bob Schill, Box 412, Hinsdale, N. H.

FOR SALE — Philco 7053 pix tube checker, $15; Hickok CRT tube tester pix tube adaptor, $5.95; inductor for GE ST4-A sweep generator, $15, 1. n. John R. Young, Box 265, Grottoes, Va.

FOR SALE — Pentron T-90 Pace Maker tape recorder, two speaker Hi-Fi, 1956 model, 1. n., $100. Thomas Migliorino, 187 No. 17 St., Bloomfield, N. J.

FOR SALE — Hallicrafters SX42 FM-AM rcvr good operating cond., $150. Paul Wunsch, Jr., 421 Clifton Ave., Clifton, N. J.

WANTED — Recent college course in Electronic Engineering including Radio and TV. Must be complete. Send list of texts and price. Edward Kinghorn, 214 S. Memminger St., Greenville, S. C.

FOR SALE — Transcription arms: RCA universal, and WE5A equalizers and cartridges; 3 RMC with cartridges (need rebuilding); 2 Audak 74A with cartridges — all low impedance; Weston 743 0-5 amp external thermocouple meter. Robert Schilling, c-o WIMS, Michigan City, Ind.

FOR SALE — Like new 10 w. amplifier: 6V6 GT push-pull, phono motor outlet and pick-up input, $36 for amplifier and 2 quality sp'rs. A. Kolkin, 2681 West 2nd St., Brooklyn 23, N. Y.

FOR SALE — Rider's 1-4 to 13 inclusive other Riders. No reasonable offer refused. W. E. Menchan, 7416 5th Ave., North Bergen, N. J.

WANTED — Early editions of ARRL Handbook 1 to 14; later editions 29, 31, and 32; also Editors and Engineers Radio handbooks editions 1 to 4, 8, 12, and 14. Marvin Gurlin, 111 White Horse Pike, Audubon 6, N. J.

FOR SALE — 5" Heath 0-5 scope, $30; TS-1A-TV alignment generator, $30, Riders 1 to 5 abridged, 7-13 $5 each plus postage. Franks TV Service, 119 Rambler Rd., Glenolden, Pa.

WANTED — Instruction manual for OBL-3 scope made by Triumph Mfg. Co. Chicago, for Navy in 1945. Will pay reasonable price or swap. Mack O. Santer, 544 East 6th St., New York 9, N. Y.

FOR SALE — Hallicrafter S41, $15; ATR 6 v. Battery eliminator, $15; Triplett sig. gen. 165 kc to 40 mc, $15; Webster 81-1 wire recorder with mike and wire, $35. All 1. n. Joseph Malak, 5164 Haverford, Lyndhurst, Ohio.

SELL OR SWAP — Eico 1040 eliminator. HS33 headset, QST 1937-48 complete, Radio and TV News, ARRL Handbooks 46-48-49-52, TV for Radiomen by Noll. Raytheon VR6113, etc. Send needs. M. Marshall, 455 Washington Ave, Dumont, N. J.

FOR SALE — Used chokes and xformers UTC type LS21, 22, 30, 34, 95, 96, S31, 58 and CG-59AX; all in excellent cond. John Schneider, 965 Wolf Rd., Des Plaines, Ill.

FOR SALE — Heath GD1A, $12, Heath 7C Amplifier, $13; Pilottuner, $12; 0 to 50 ma, 0 to 100 ma, 0 to 400 ma meters and xmitting tubes. R. F. Faeth, 11 Godfrey Terr., Glen Rock, N. J.

FOR SALE — Heathkits; AR3 communications all-band rcvr with cabinet, $35; S6-8 RF sig. gen., $25; OL-1 3" scope with demodulator probe, $39. All wired and tested. J. Rosenbusch, 5344 Delmar Rd., Clifton Hts., Pa.

FOR SALE — S38B, $20; NC-98 with speaker, $110; Bud CPO-128A, and LF-601 lo-pass filter, $10 each; Hylite 3 element 20 meter beam, $40; etc. Write your needs — no trades. Wm Buffington, 5208 Birkenhead Rd., Jacksonville 10, Fla.

FOR SALE — Transvision TV set, Bogen DB110 amplifier, phones, mikes, meters, broadcast audio components, speakers, tubes, rotary converter. S. Friedland, Apt. 1301J, 568 Grand St., New York 2, N. Y.

SELL OR TRADE — Riders 1 through 14, $7.50 ea.; Bar gen., 1. n., $20; TV-11 tube tester, 1. n., $35; Supreme tube tester, $10, trade for antiques, curios, etc. Fogleman, 1721 Fort Davis St., S. E. Washington 20, D. C.

WANTED — Hickok 210S VOM, and model 900 volt-amp-wattmeter. State cond. and price. B. R. Summers, 1939 Alpine Dr., Colorado Springs, Colo.

SELL OR TRADE — Philco sig. gen., tubes, approved Elect. Inst. Corp. 400 A sweep gen., 2KW-115-230 to 115-230-410 v. xformer and 1KVA variable voltage xformer for HV xformer. D. Buck, 32 Ardmore Terr., Collingswood 7, N. J.

FOR SALE — Three unused 0-1 MA 4" square bakelite meters, knife-edge pointer, VOM scale, 50 ohm internal resistance, in factory boxes. Ship postpaid $5 each. L. Wienreb, 151-09 34th Ave., Flushing 54, N. Y.

WANTED — Old and inoperative Solar test equipment. State cond. and price wanted. Leon Kopelman, Box 484, Bloomfield, N. J.

FOR SALE — NRI complete radio and TV course, test meter included, $35. Paul Mole, 135-11 225 St., Laurelton 13, N. Y.

WANTED — Small portable 40 or 80 meter CW xmitter and rcvr battery operated home brew, surplus or what have you? Donald F. Guptill, 17 Park St. Ct., Medford 55, Mass.

WANTED — Used National Radio Institute course. Kits not necessary. Warren S. Hayes, Apt. 9E, 1777 Grand Concourse, New York 53, N. Y.

FOR SALE — Johnson Adventurer, Heathkits AT-1 and VFO, Ameco low-pass filter 807W (5933), 25 w. Thordarson modulation xformer. Want TV pickup tubes such as Iconoscope, Image Orthicon, Vidiocon, etc. William Stern, 99-19 66 Rd., Forest Hills 74, Queens, N. Y.

FOR SALE — Jensen H222, CT-100 system 3-way-mah; Bogen 600 w. two 60R remotes; Webster 1127-270GE 3-speed changer; Hallicrafters R-46 speaker, $5; Akro-Mils J16, SC12, J32SD, J64SD small parts cabinets. Richard Ebeling, 33 Randolph Rd., White Plains, N. Y.

TRADE — Simpson 480 Genescope with variable crystal marker to 250 Mc, sweep to 250 Mc. and scope for Ham xmitter and rcvr of equal value. Unit cost $475. S. Rand, 27 Forest Ave., Ossining, N. Y.

FOR SALE — T-47 ART-13 xmitter complete with DY-17, C-87, CU-24, cables and plugs, 11 new and 3 used major assemblies, and over 300 new parts. All for best offer over $1000. John W. Cale, Norwood, Mo.

FOR SALE — Two BC-222 xmitter rcvrs, range 28-52 mc., clean cond., need slight repair, antennas, but less batteries. Highest offer. Mr. B. J. Desind, 2458 Shirley Ave., Baltimore 15, Md.

FOR SALE — Superior 670-A volt ohm Super-meter, DC v. 0 to 7500. AC v. 0 to 3000, 1. n. perfect cond with instruction books, $25. Daniel Seidler, 4216 So. Washtenaw, Chicago 32, Ill.

FOR SALE — Chicago Hams xmitting tubes, relays, filter condensers, UTC Varitran, 3" RCA scope. Macy, Apt. 6-E, 2440 Lake View, Chicago, Ill.

WANTED — Natl RCK rcvr also Motorola 25-44 Mc FM mobile or station rcvr. State exact cond. and best price. Laurel Z. Keene, 3423 Edgewood St., Ann Arbor, Mich.

SELL OR SWAP — Five-inch DTI scope without case, $25, or swap for sig. gen., tube checker, sig. tracer, or what have you? A. Stolarick, 61 W. Brown St., Apt. 5, Somerville, N. J.

FOR SALE — Regency RC600 UHF converter, $15; Eicor 115 tape recorder with two speeds, $35 plus shipping costs; Ghiradi's Radio Physics Course, $2.50; Buchsbaum's TV Servicing, $2. All in good cond. Would trade for CREI course. Austin Wright, Norwich, Kan.

WANTED — General Radio 650A Impedance Bridge or equivalent; back issues of IRE Proc., Electronics. Give details, cond., price. Jerome Tannenbaum, 5240 S. Harper Ave., Chicago 15, Ill.

SELL OR TRADE — NRI course, $25 postpaid; Precision E-200 sig. gen. with manual, l. n., $35; Rider Manuals, 1-5 through 14 (ten books) $50; Sam's, 1 through 5 (1-4 in binders) $55. All fob. Harold Garrett, 711 South N. Y., Sedalia, Mo.

WANTED — FM rcvr 152-162 mobile or 115 v.; tape or disc recorder; telephone answering recording unit; gasoline AC gen.; movie projector; Geiger counter; AC welder and AC voltmeter. Cash waiting. S. Krzak, 65 Main, Pawcatuck, R. I.

SELL OR TRADE — Viking Ranger, Hallicrafter SX99, AC relay, Balun coils, Astatic Mike, all in good cond., $225 cash or complete mobile 6 v. equip. Frank Introvatolo, 1481 Myrtle Ave., Brooklyn 37, N. Y.

WANTED — 7JP4 picture tube, must be reasonable and in perfect working order; good 8mm movie projector. Raymond Fisher, 627 Fallowfield Ave., Charleroi, Pa.

FOR SALE — Hallicrafter SX-99 receiver, never used. Will sacrifice for $129.95 FOB. E. Abrams, 335 South 2nd St., Brooklyn 11, N. Y.

FOR SALE — Meters, cased, perfect: 3½" flush panel Weston: 0-150 AC v.; 0-50 AC amps; WE 20-0-20 DC amps; Simpson 3" sq. 1-5 AC amps, $6 ea. or $20 for lot. H. M. Lester, 270 West End Ave., New York 23, N. Y.

WANTED — Sam's Photofact 1-90, 151-160, 191-200. D. F. Gorham, 42 Fenway, N. Milford, Conn.

WANTED — Radion FSM 5000 Field Strength Meter. Gordon J. Bastian, Box 1341, Taos, N. M.

FOR SALE — Heathkit 0-10 color TV 5" scope; low cap. probe; scope demodulator probe; Eico condenser substitution box. Excellent working cond., all for $40 plus shipping. Walter Dietz, Box 165, Acton, Calif.

WANTED — A Century or other make "In-circuit" capacitor-resistor checker; pocket radio; transistor intercom. State price and cond. Local preferred. Leo Adas, 1842 No. Keystone Ave., Chicago 39, Ill.

FOR SALE — Set male and female 4-pole Cannon; 2 sets male and female 4-pole Amphenol heavy duty connectors, $2 per set or all 3, $5 plus postage. Austin Wardman, 106 Rossmore St., East Pittsburgh, Pa.

FOR SALE — 522 2-meter rcvr and xmitter, with tubes, no power supply; BC624A 2-meter rcvr; RME MC 55, 6-12 v. mobile converter 80 to 10. Want 10 meter Beam; Johnson Match Box. Stephen Bossey, 69 E. Suffolk Ave, Central Islip, N. Y.

FOR SALE — Harvey-Wells TBS50D, $69; Gonset 2-meter converter, $18; 120 w. phone xmitter 80 to 10 (built by electronic's engineer TVI'd $80; RME MC-55 mobile converter 80 to 10, 6-12 v., $30. M. Misiak, 20 Harriet Pl., Massapequa, N. Y.

FOR SALE — Mobile FM converter 39.58 mc, $25; Eico 5" scope, $50; AM gen., $20; FM gen., $35; R-C bridge, $20; Fada 630, $15; V-M changer 4-pole motor GE head, $35. James Sutherland, 416 Ritchie Hwy., Glen Burnie, Md.

TRADE — Tube tester; 5" scope; VOM; record changer, TV xformers; antique radio; CRT tubes; 12" speaker, signal stethescope, 4-v. battery charger, pot switch 50,000 ohm per step. Need Poloroid 95 or wire recorder or? Karl G. Muck, R.F.D. 2, Warsaw, N. Y.

FOR SALE — Simpson 479; $250; Hickok 670, $150; or both for $360, ppd. G. W. Aulabaugh, Cortland, Ill.

FOR SALE — Like new National SW 54 rcvr used about 9 hours, $35. D. E. Zeitz, 247 Conant St., Hillside, N. J.

WANT — Good tape transport, Magnecord, Berlant, Concertone, etc. State details. Robert C. Merchant, 2701 Oxford St., Lafayette, Ind.

FOR SALE — RCP 808A do-all tube and set tester; vacuum tube tester; pic. tube tester; pic. tube reactivaor; VTVM, ohmmeter. Fairly new, $75. C. Endriunas, 254 W. Grand St., Elizabeth, N. J.

FOR SALE — National NC88 rcvr in original carton, cost $119.95. No reasonable offer refused. B. Krauthamer, 124 Maujer St., Brooklyn 11, N. Y.

FOR SALE — Sams Photofacts folders 1 to 198, 75 cents each; Eldico TVD-62 filter, $10; Riders 1-15 good cond. Make offer. Joe Newberg, Stone Rd., Lexington, Ky.

FOR SALE — Texas Instrument transistors, type 904A, 905, $15 each; type 951, 952, 953, $11.50 ea. Like new. J. C. Haywood, 8603 120th St., Richmond Hill, N. Y.

SELL — 3 el., 20-meter Hylite beam, $32.50; 813's $7, 20, 10 TVL coils, $1.75 each; Jack bar and swinging link assembly, $1.25. Paul Bittner, 55 E. Crystal Lake, Crystal Lake, Ill.

FOR SALE — 1954 Chrysler Mopar radio, $25; several 0 to 10 Miliammeters DC, 3" round, $2 each. Ernest L. Winterkorn, 175 Lake St., Waltham 54, Mass.

FOR SALE — MIT Radiation Labs model 5 synchroscope built by Sylvania, has 5Mc vertical amp. response. Excellent cond., $125. Dunlap Electronics, 764 9th St., Des Moines, Iowa.

SELL OR TRADE — Color TV, Motorola 15" console, for right combination of communications rcvr, xmitter, scope, cash, Chicago area only. Burton G. Mendelson, 333 Southgate Drive, Northbrook, Ill.

SELL OR TRADE — Heathkits: AT-1 xmitter, and AC-1 antennae tuner. Two 40 meter and two 80 meter crystals, best offer over $35, or trade for Hi-Fi equip. Lawrence Benjamin, Box 49, Hutchinson, Minn.

FOR SALE — Like new Meissner Ex-Signal Shifter, $29.50; WRL 500 w. all band antenna coupler, $22.50; Globe King 420 w. xmitter with coils 20-40-80, $300, FOB. J. C. Stansberry, Box 108, Clinton, Iowa.

FOR SALE — SX-43 Hallicrafter rcvr with matching speaker. Excellent cond., $125 plus shipping costs. John W. Cale, Norwood, Mo.

WANTED — Johnson match box and sig. sentry; also Baluns for 20 and 40 meters. John H. Elrod, 4007 18th St. N.W., Washington 11, D. C.

FOR SALE — Steel enclosed cabinet, 42" x 22" (37" x 19" panel space), $18. Desire late good cond. Abbot TR4. Joseph F. Dineen, 9 Winter Terr., Westwood, Mass.

FOR SALE — Back issues of QST, CQ and Radio from 1930 to 1954, 25 cents each, 5 for $1. Miscellaneous 3" meters in various ranges, $2.50 each. Art Johnson, 29 Boone St., Bethpage, N. Y.

FOR SALE — Novice-bands CW xmitter 15-40-80 meter coils, crystals and operating manual; Hallicrafter HT-17 30 w., $35. H. A. Pearson, 6 Rowan Ct., Fords, N. J.

SELL OR TRADE — Heathkit C-2 condenser checker l. n., $15; NRI model 11 VTVM, $35. Need antique disc records 1920 to 30, also reproducer heads as used on old crank up victrolas,. Chester Wegrzynowski, 51 N. Central St., Buffalo 12, N. Y.

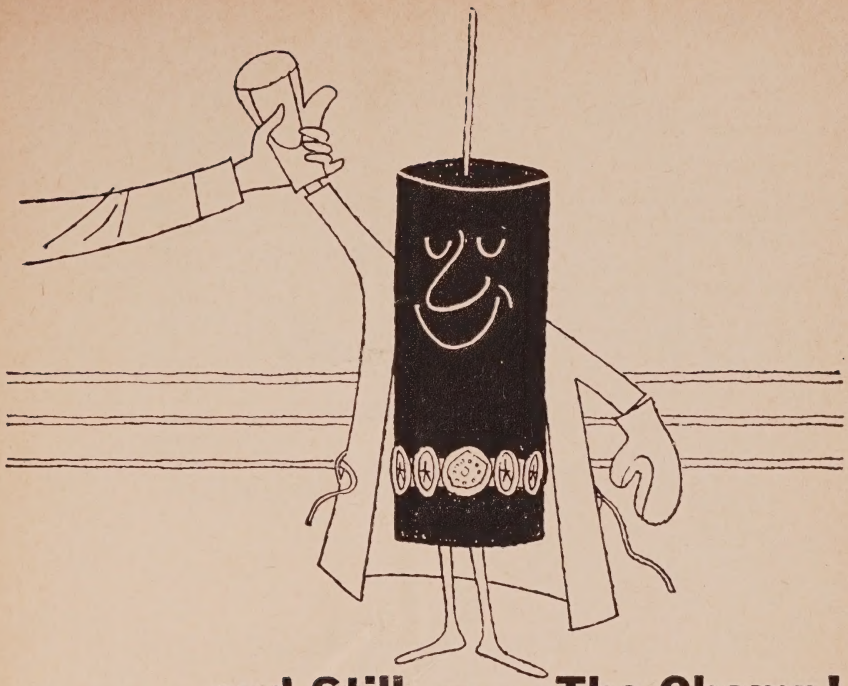
FOR SALE — Stancor ST-202-A 125 w. CW xmitter, tubes, xtals, 10 and 20 meter final coils, $50. Will answer all inquiries. M. Vassallo, 99 Greenpoint Ave., Brooklyn 22, N. Y.

WANTED — Beam filter type NAF 68304, perfect shape, no changes. Pay good price. R. B. Parker, 38 Ayer Lane, Harwichport, Mass.

FOR SALE — Eico 425 scope, $30; 315 sig. gen., $25; 360 sweep gen., $20; 221 VTVM, $20; mobile rig complete, $75. A. L. Jeffrey, 1321 Brinton Rd., Pittsburgh 21, Pa.

FOR SALE — Millen 500 w. final, coils all bands, pair 812's, complete modulator for same, all power supplies, and mounted in 42" rack (not de-TVI'ed) $100 FOB. Vic Stout, 4640 York Rd., Baltimore 12, Md.

SELL — Zeiss Ikoflex II 2¼ x 2¼ reflex camera, pre-war, with Zeiss Tessar 3.5 lens, Compur rapid shutter and heavy imported leather carrying case, all in excellent cond., or trade for good National or Hallicrafters all-wave rcvr. David Teitelbaum, 143-50 Hoover Ave., Briarwood, Queens 35, N. Y.



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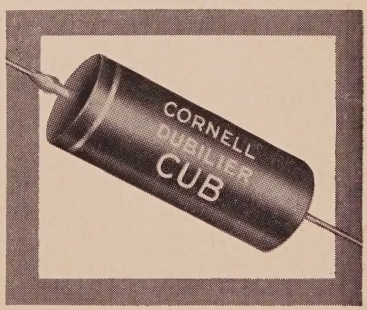

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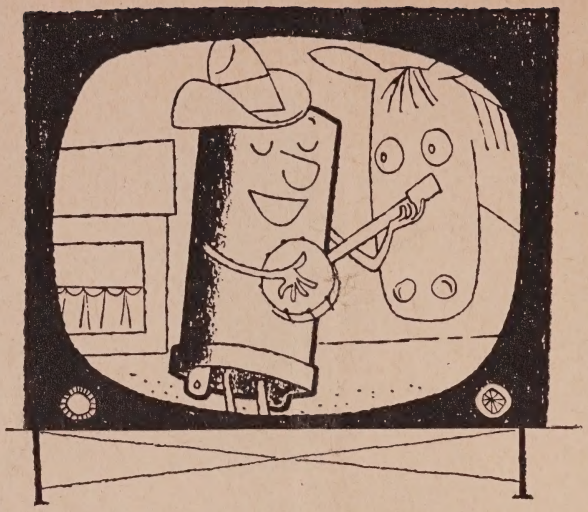

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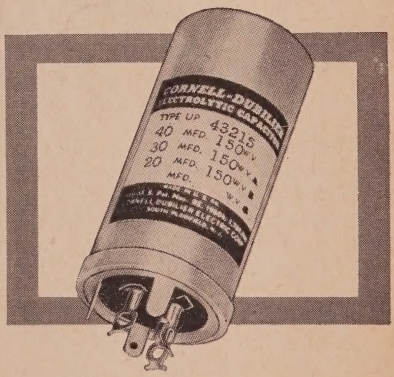

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